

# **Simulation Based Acquisition**

## **- *The 2nd Year* -**

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*Presentation to  
DMSO Industry Days  
June 3, 1999*



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Industry  
Steering  
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**SBA  
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(Page 2)**

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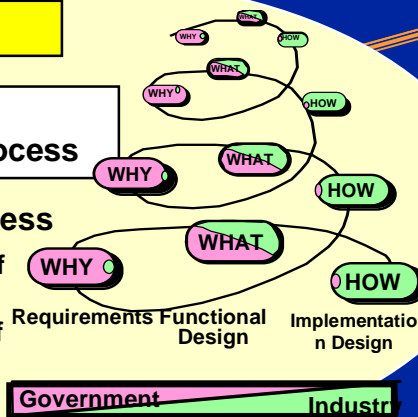
# SBA - NOT JUST TECHNOLOGY

## Process

### Iterative Acquisition Process

#### • Iterative Spiral Process

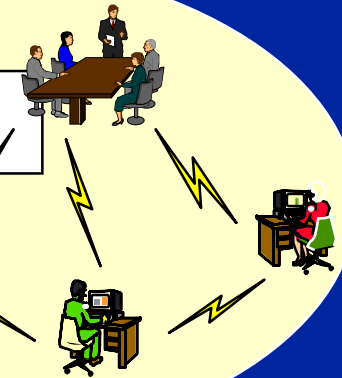
- Electronic Exchange of System Models
- Rapid Evaluation of Multiple Options



## Culture

### Evolved Acquisition Culture

- Enabled Integrated Process Teams
- Changing Roles and Responsibilities



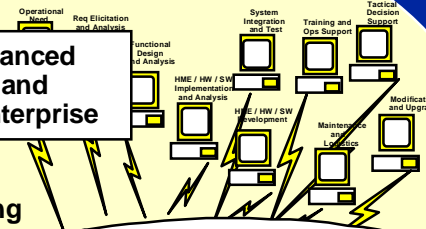
## Environment

### Integrated Advanced Engineering and Management Enterprise

- Collaborative Distributed Engineering
- Seamless Integration of Engineering Disciplines

Common Project Data Repository  
Integrated Product Process Model  
Format

- Info Repository
- User Transparent Web Style Access
- Integrated Design Data Schema

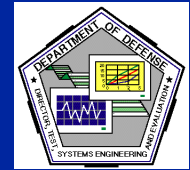


Together, these will facilitate --

*An unprecedented quality of enterprise-wide, collaborative decision making across the acquisition life-cycle...*



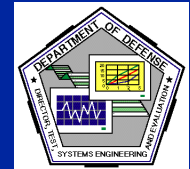
# RECAP: WHAT IS SBA?



- **SBA is a robust M&S engineering environment --**
  - Starting early, from initial requirement & concept
  - Intensive “wringing-out” in synthetic, collaborative environment of cost, function, performance across system life cycle
  - Reuse of M&S across system life cycle, across programs/services
- **SBA is a revised acquisition process --**
  - Integrating Requirements, Acquisition, Training, Operations, Sustainment, T&E, etc functions using collaborative environment
  - Rapid, multiple assessments of trade space prior to locking requirements
  - Thorough understanding early of total ownership cost implications of performance requirements & design
- **SBA is cultural change --**
  - New educational curriculum
  - Empowered collaborating teams, including industry partners
  - Up-front emphasis & investment on M&S
  - Increasing reliance on M&S to reduce design risk



# IS THERE A SOUND-BITE FOR SBA?



## Vision

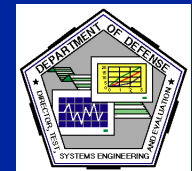
...to have an Acquisition Process in which DoD and Industry are enabled by robust, **collaborative use** of simulation technology that is **integrated across acquisition phases and programs.**

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*...its all about virtual development,  
and leveraging M&S reuse!*

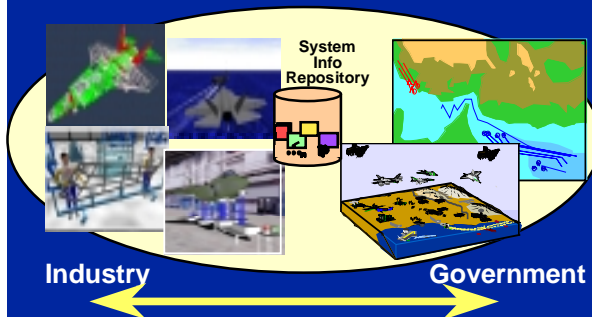
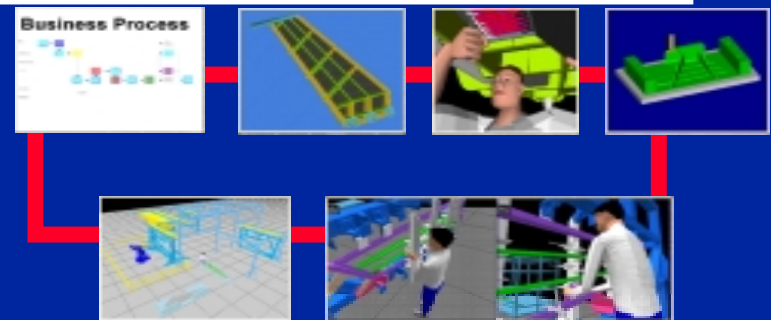


# IN SBA, M&S TECHNOLOGY MUST ENABLE



**Access Controls**

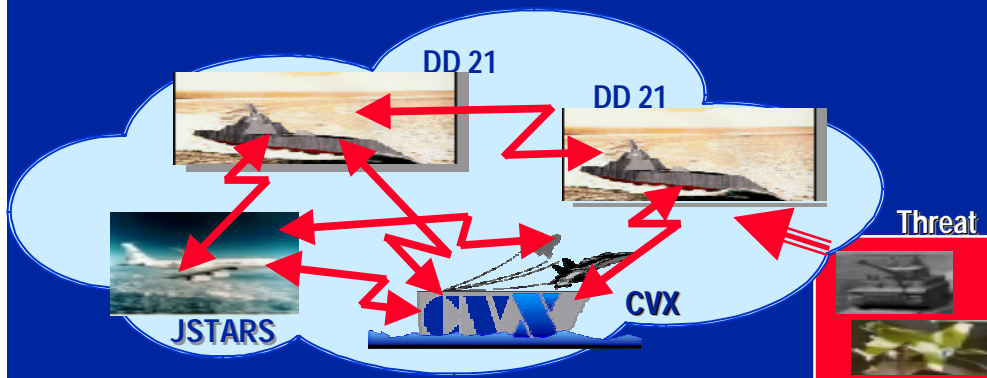
Linking unrelated M&S (cost, engr design, op eval, O&S, manuf, etc)



Interoperability & reuse in system design, across programs & services (Govt & Ind)

**Visualization**

Rapid, credible analysis of entire trade space

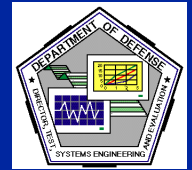


Early assessment in Collaborative Environment of system interfaces



# THE MAKING OF SBA

Industry has been an essential player!



## Year 1 DMSO Industry Days, June 1997

Year 1  
↓

- **Industry** Challenge to Government : “If serious about SBA, it must be a partnership with industry.”
- Government & **Industry** agreed on SBA Vision
- **Industry** drafted CONOPS, Need Statement, “AS-IS” technical M&S infrastructure assessment
- **1st national SBA Work Shop**
- Government formed Joint Task Force to develop Roadmap

## Year 2 DMSO Industry Days, June 1998

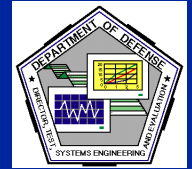
Year 2  
↓

- **Quality Function Deployment** exercise ranked needs
- Roadmap published, refined, staffed for **coordination**
- **2nd national SBA Work Shop**
- DSMC publication “SBA: A New Approach”
- Nine “core issues” worked
- 5000 Policy for M&S strengthened
- POM and Implementation plan drafted





# - AGREEMENT - SBA KEY ARCHITECTURE PIECES

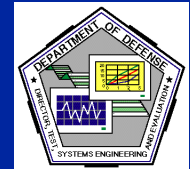


- Distributed Product Description (DPD)
- Distributed/Industry Resource Repository (DIRR)  
→ **Key tenet: Partnership with Industry**
- Collaborative Environments (CE)  
→ **Key tenet: Share/reuse across program lines**
- Data Interchange Formats (DIF)

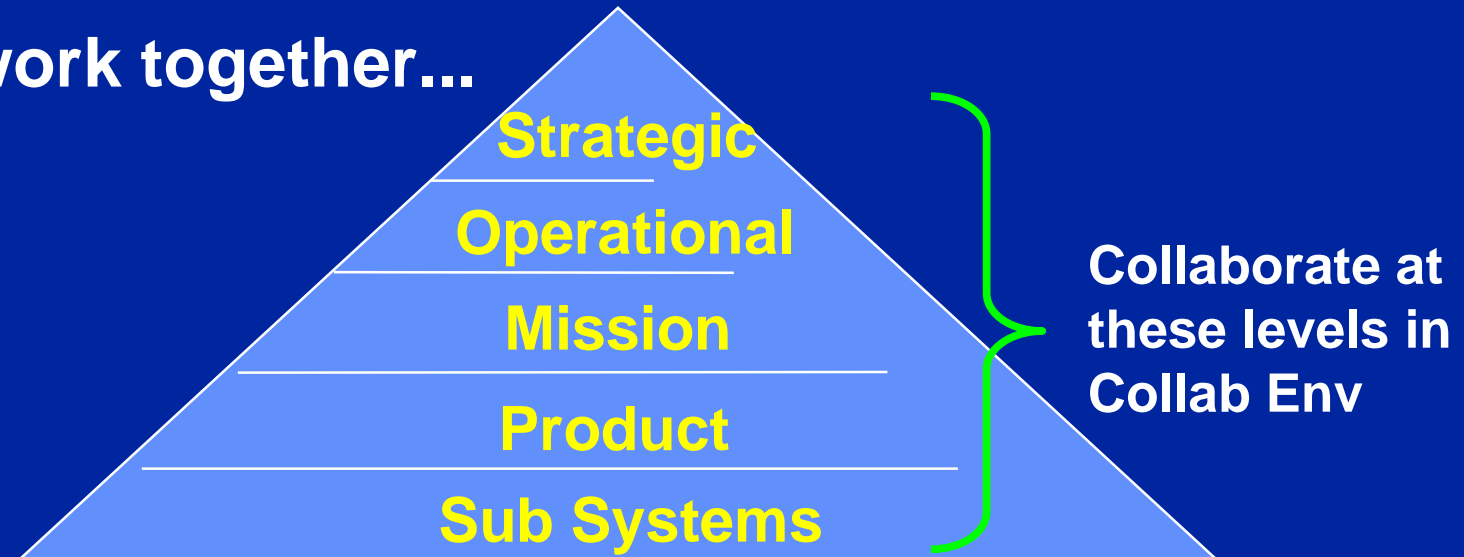
*Per: the Roadmap, the DSMC research, the QFD process, and ISG studies*



# SBA OPERATIONAL ARCHITECTURE



How we work together...



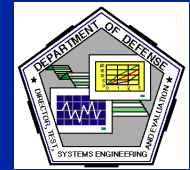
## Operational Architecture

Mission  
Dependent

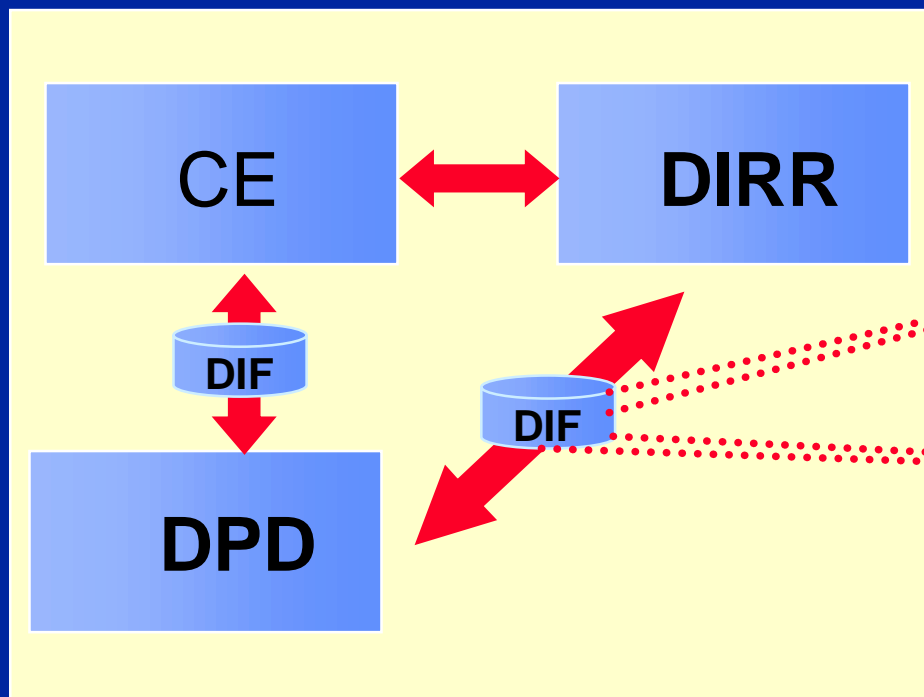
- Who works with whom?
- Who shares/reuses?  
(I.e. who *collaborates* with whom?)
- Blind to organizational boundaries
- Functions, information flows, activities



# TECHNICAL AND SYSTEMS ARCHITECTURES - HOW KEY PIECES FIT TOGETHER -

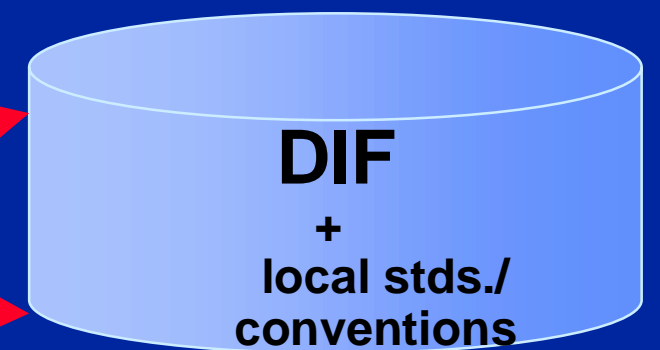


The tools to work together:



Systems Architecture

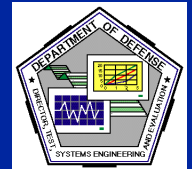
The language to communicate:



Technical Architecture



# DISTRIBUTED PRODUCT DESCRIPTION (DPD)



- In its simplest form, a 3-dimensional representation of a system, along with associated process data
  - Functional information (what does this thing do?)
  - Requirements information (why do we need this?)
  - Manufacturing information (what special tooling do we need to produce it?)
  - Cost information (how much does it cost?)
- Other features like “user selectable views”

## Distributed Product Description (DPD)

Physical 3D  
Rendering

Requirements

Functional  
Descriptions

Cost Data

Engineering  
Data

Process  
Models

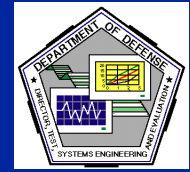
(Other ...)

Manufacturing  
Data

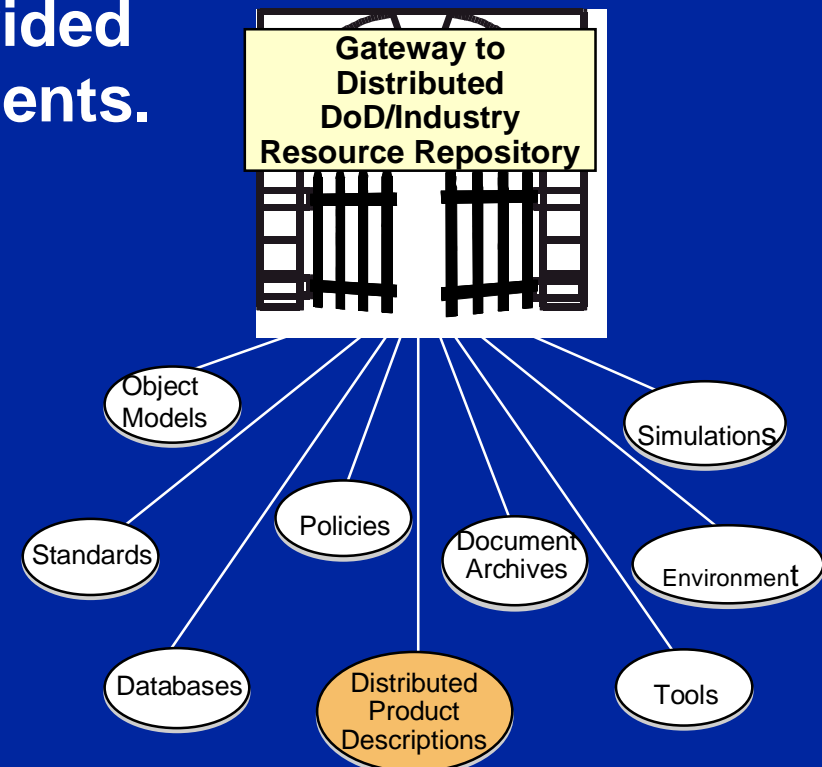
Authoritative  
Models



# DOD/INDUSTRY RESOURCE REPOSITORY (DIRR)

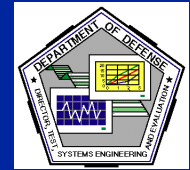


- A collection of pointers constituting a web technology-based distributed repository of tools, information resources, and generic infrastructure components for use within and reuse across acquisition programs
- The union of capabilities provided by all Collaborative Environments.

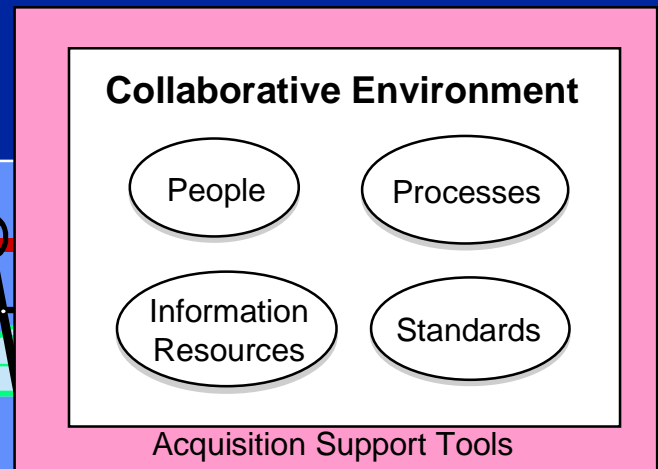
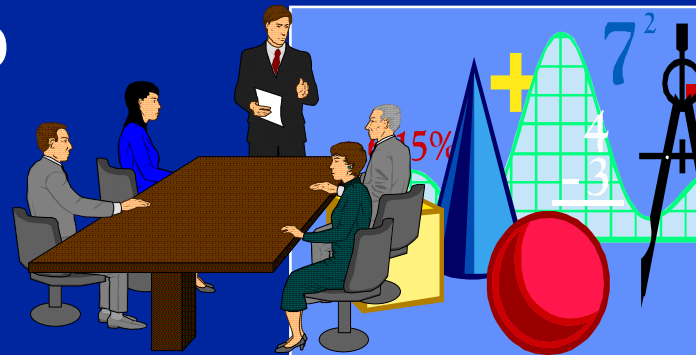




# COLLABORATIVE ENVIRONMENTS (CE)

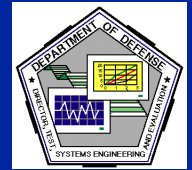


- An enduring collection of resources, people, processes, and tools assembled to attack a given problem
- Cross Program/Phase
- Mission or Product focus
- Enables IPPD



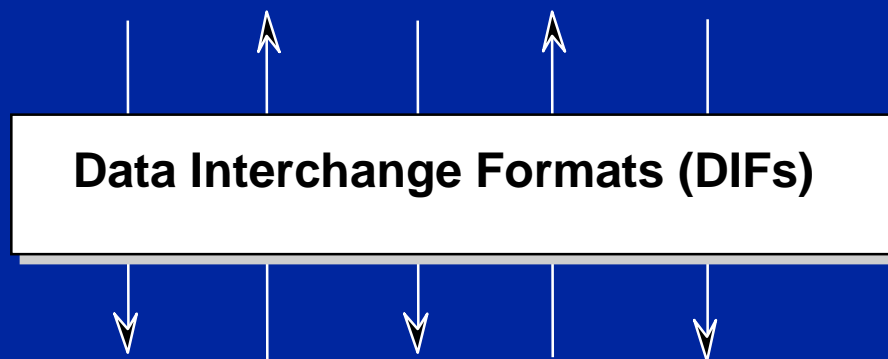


# DATA INTERCHANGE FORMAT (DIF)



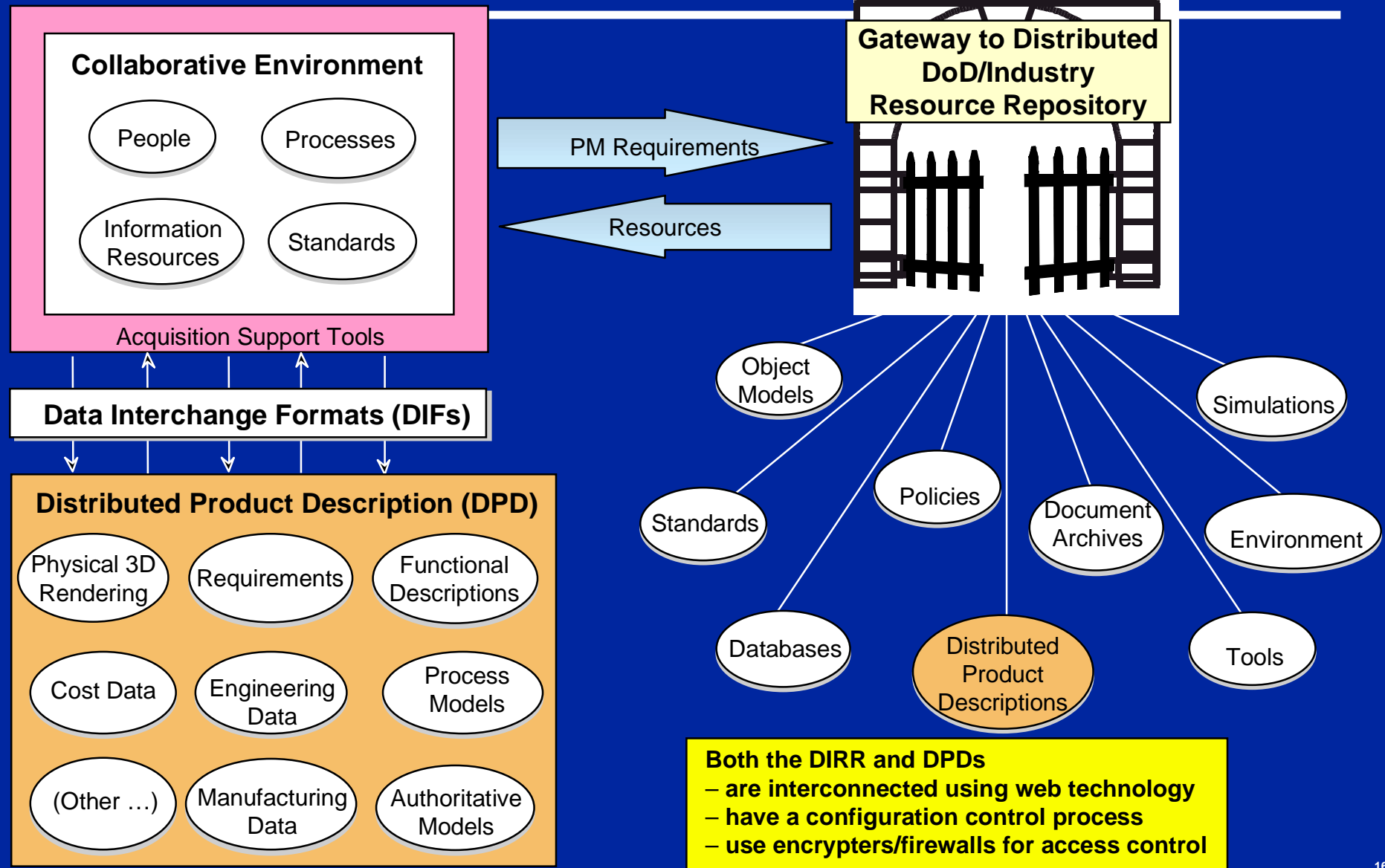
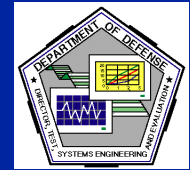
- An extension to existing DIFs where they currently exist, such as SEDRIS
- The “go between” for DPDs and the outside world (DIRR, etc)

***...The essence of SBA technical architecture***





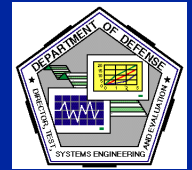
# TOP-LEVEL VIEW OF SBA SYSTEMS ARCHITECTURE







# POLICY CHANGES



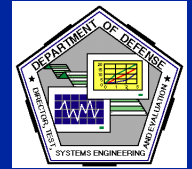
## DoD 5000.2-R, Change 4

(released 11 May 1999)

- A modeling and simulation approach is an essential element of an Acquisition Strategy
- Simulation, Test and Evaluation Process is added to the Test and Evaluation Section



# **FUTURE POLICY CHANGES**



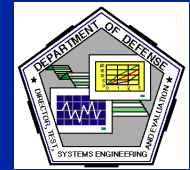
## **Sharing M&S with Industry**

**A pending change to DoD 5000.2-R addresses models and simulations used in the source selection process to evaluate competitive proposals.**

**Such M&S would be shared with industry well in advance of the selection process.**



# COMMON PROCESSES

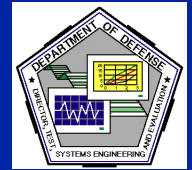


- Example -- Threat Representation M&S
  - Acquisition FWG working with Intel Cmty to establish process to clarify threat M&S development
  - Fosters:
    - Reuse and interoperability in threat representation
    - Early involvement of Intel Community for V&V





# GOVERNMENT - INDUSTRY PARTNERSHIP

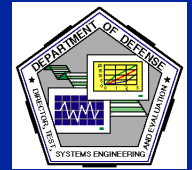


- **Objective:** Establish Government/Industry Architecture Development and Standards Group (ADSG)
- **Purpose:** Integrated Industry and Government participation in SBA technical concepts and recommendations for SBA implementation
- **How:** A number of vehicles/mechanisms exist; which structure evolves will depend on specific needs





# OTHER EVENTS

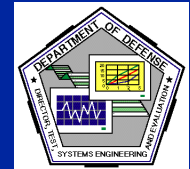


- **DSMC Publication: “SBA - A New Approach,” 1997-98 Research Fellows**
- **Acquisition Reform video: “SBA - The Way Ahead”**
- **Development of “core body of knowledge” for acquisition professional courses**
- **Navy BAA - Collaborative Engineering Environment**
- **Army Dual Use S&T BAA - Collaborative technologies, data management, product modeling**
- **M&S Awards in Acquisition**





# WHAT'S AHEAD?



## Today DMSO Industry Days, June 1999

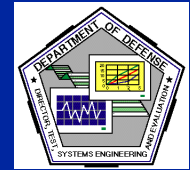
- Roadmap “On The Shelf” (guiding document)
- Industry (NCAT) partnership formalized
- ISG assist JSF to develop first operational SBA DPD
- POM resources
- Implementation plans
- First SBA business game
- Architecture Development & Standards Group
- 3rd national SBA Work Shop
- Military Services’ “pathfinder” projects
  - DIRR - DPD - DIF - CE
- Experiments in planning
- DMSO Workshop for PMOs
- Educational curriculum
- Policy
- Culture, culture, culture

Year 3





# SBA KEY CONTACTS



<b>OSD</b>	<b>Robin Frost, OUSD(A&amp;T)</b>	<b>(703) 695-2300</b>
<b>Army</b>	<b>Ellen Purdy , OASA(ALT)</b>	<b>(703) 604-7006</b>
<b>Air Force:</b>	<b>Major Gerry Smithers, SAFXO</b>	<b>(703) 588-7191</b>
<b>Navy</b>	<b>John Bilmanus, Nav Acq Ref</b>	<b>(202) 610-7022</b>
<b>DMSO</b>	<b>Col Ken "Crash" Konwin</b>	<b>(703) 998-0660</b>
<b>Industry</b>	<b>Steve Olson, Raytheon</b>	<b>(703) 876-1942</b>
<b>Steering Group</b>		

## **SBA Special Interest Area**

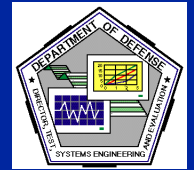
**<http://www.msosa.dmsso.mil/sba/>**

## **M&S Effectiveness Study**

**<http://www.acq.osd.mil/te/pubdocs.html>**



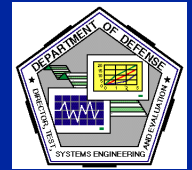
# Back Up







## 3.3 ACQUISITION STRATEGY



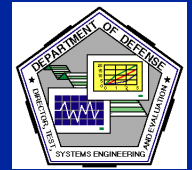
“Each PM shall develop and document an acquisition strategy.... Essential elements ... Include ... **modeling and simulation approach...**”

*Reference: DoD 5000.2R, chg 4, 11 May 1999  
(**New content in yellow**)*



## ACQUISITION STRATEGY

### **3.3.8 MODELING AND SIMULATION (M&S) APPROACH**



**M&S shall be applied...**

- **throughout the system life-cycle ...**
- **to supplement actual T&E, manufacturing, and logistics support.**

**In collaboration with Industry, PMs shall**

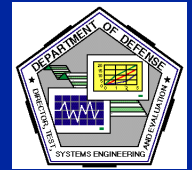
- **integrate M&S within program planning activities;**
- **plan for life-cycle application, support, and reuse of models and simulations;**
- **integrate modeling and simulation across the functional disciplines.**

*Reference: DoD 5000.2R, chg 4, 11 May 1999  
(**New content in yellow**)*



## Test and Evaluation Section

### **3.4.4 MODELING AND SIMULATION**



- **M&S shall be integral to T&E...**
- **Simulation, Test and Evaluation Process (STEP) ... in the TEMP ... a robust and comprehensive evaluation strategy, using both simulation and test resources.**
- **...program office shall work with the T&E community in developing this evaluation strategy**
- **...identify and fund STEP resources early**

*Reference: DoD 5000.2R, chg 4, 11 May 1999  
(**New content in yellow**)*